

REMARKS

The Examiner has rejected Claims 1-51 under 35 U.S.C. §103 as being unpatentable over Ho et al. (WO 95/06298). Applicant has amended the claims to clarify that the present invention is directed to hardware specifically designed to accelerate the calculation of lighting equations. More specifically, the present invention requires two distinct elements (1) dedicated lighting hardware used to calculate a portion of the lighting equations, .e.g. lighting coefficients such as specular lighting coefficients or normalized point light vectors and (2) per pixel user programmable hardware logic operable to receive the information from the dedicated lighting hardware and perform additional lighting calculations. This particular structure is important because it allows for the acceleration of the lighting equations in a specific manner that allows complex lighting situations to be effectively rendered in real time.

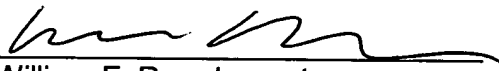
In contrast, Ho only teaches the use of programmable elements such as the Ho TransflectanceShader, page 16, line 24; page 18, lines 1-4, page 19, lines 3-8. There is no teaching that any of the lighting calculations performed by the TransflectanceShader are in dedicated lighting hardware. Ho is further distinct because the "per-pixel" nature of the calculations in the present invention makes the Ho approach probably unworkable in such an environment. In particular, as the Examiner will recognize, to calculate the lighting equations for a complex scene on a "per-pixel" basis requires a very fast methodology.

The present invention is also distinct from previous implementations of graphics acceleration hardware because they have been unable to render, for example, multiple light sources on a "per-pixel" basis in real time. The claimed invention requires that a specific portion of the lighting equations be calculated in dedicated lighting hardware and another portion be calculated using user programmable hardware. Accordingly, even a combination of Ho with a reference teaching the general use of dedicated hardware for a computer graphics application would still not teach the claimed invention. As a result, Applicant's invention is directed to a hardware acceleration invention which can accomplish such calculations efficiently and which was not disclosed or suggested by the references of record.

SUMMARY

Pending Claims 1-51 are patentable. Applicant respectfully requests that the Examiner grant early allowance of this application. The Examiner is invited to contact the undersigned attorneys for the Applicant via telephone if such communication would expedite this application.

Respectfully submitted,


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